

Intermodal Ground Access to Airports: A Planning Guide - A Good Start

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Access to airports has been discussed as an expanding transportation problem in the US since the early 1970s.¹ As air travel, urban congestion and environmental concerns have significantly increased over the last quarter century, planning for multimodal access to airports has become an even more important topic. U.S. Department of Transportation (USDOT) guidance for airport access planning has been limited.^{2,3} The increasing need to plan for intermodal facilities and increasing airport access problems led to the development of an *Intermodal Ground Access to Airports: A Planning Guide* for the Federal Highway Administration and Federal Aviation Administration, by BMI.

This *Guide* is designed to provide policy guidance, rules of thumb, data, and analytical techniques related to airport access. It has been prepared to help airport operators, local governments, metropolitan planning organizations (MPOs), consultants and others identify the nature of airport access problems, identify alternative solutions and evaluate their effectiveness. It primarily compiles information from other sources, however it does summarize and present this information so that it can be used to systematically analyze airport access problems and alternative solutions.

The *Guide* primarily focuses on providing passengers access to commercial airports from primary origins or destinations. It deals with:

- Off-airport roads, and high occupancy (HOV) facilities up to the airport boundary.
- On-airport roads, parking circulation elements and curb facilities up to the terminal entrance.

Importance of Airport Access

As shown in Figure 1, total annual passenger enplanements in the United States, including commercial, international and commuter passengers, are projected to grow by over 400 million enplanements between 1995 and 2005.⁴ This 50 percent growth in total enplanements will generate significant problems for groundside facilities at many U.S. airports. Some components of passenger traffic will grow even faster than the average; enplanements on international flights will grow by over 75 percent and enplanements on regional commuter flights will nearly double during this ten year period.

This growth in demand for air travel will generate increased problems for groundside facilities at commercial airports, particularly airport access facilities. Historically, passengers have predominantly used the private automobile to access airports, and this will probably continue to be the primary mode of access for the foreseeable future. However, as passenger demands increase, multimodal alternatives will become increasingly important to the efficient utilization of access facilities on and around U.S. airports. Enplanements at small and medium hub airports, where a large percentage of regional commuter service is provided, will increase at a faster than average rate. Even these airports, that have had very little multimodal access in the past, will probably need to increase access options provided to passengers using their facilities in the future.

In 1994, nearly 100 operators of small, medium and large hub airports were surveyed by Airport Council International-North America (ACI-NA) regarding the importance of airport access issues

affecting their airports.⁵ Operators were asked to rate airport access issues on a scale of 1 (no problem) to 5 (significant concern).

Three of the identified areas of concern were:

- Off-airport access roadway congestion,
- On-airport roadway congestion, and
- Curbside Congestion

The results of this survey are shown in Table 1. At least a third of all surveyed airports rated all three areas with a 4 or 5. At least 45 percent of

large and medium hub operators expressed concern for on- and off- airport roadway congestion. Operators of over 75 percent of these larger airports and nearly 50 percent of small hub operators expressed concern over curbside congestion.

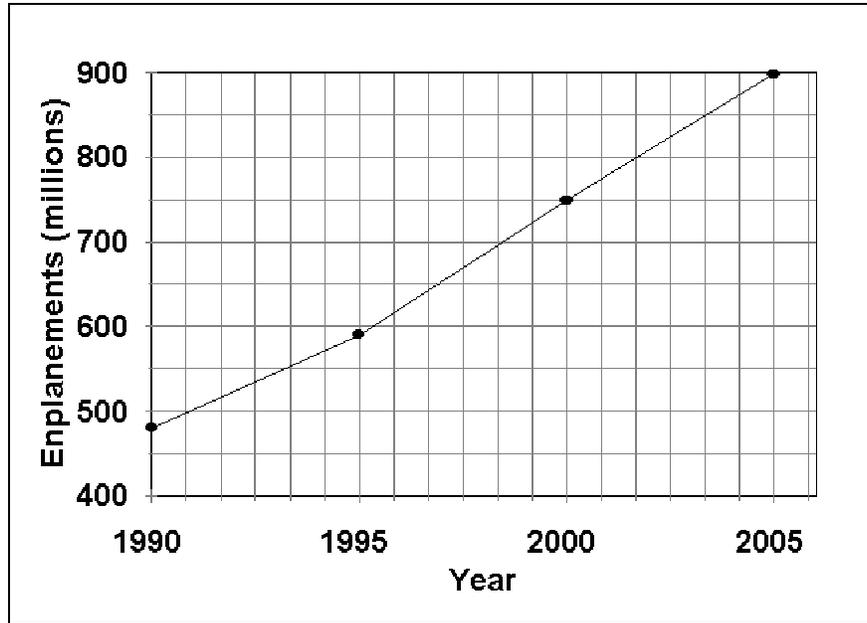


Figure 1: Total scheduled passenger enplanements at US commercial airports

Travelers and operators alike have become increasingly aware that air travel is comprised of a combination of time in the air, time spent at the airport, and the time on the ground spent getting to and from a destination. Nearly 75 percent of airport operators surveyed by ACI-NA indicated that passengers experience more delay on access and circulation roads than they do on the airfield. As access to airports becomes more difficult and time consuming, inadequate access will increasingly limit the growth potential of airport facilities. Some researchers predict that as air travel increases the number of multiple airport hubs will increase.⁶ Airports in neighboring metropolitan areas also are competing with each other as demonstrated after the opening of the new Denver Airport and as has been experienced for over a decade in the Baltimore and Washington metropolitan areas. As air travel times from competing airports become more and more comparable, airport access will become more of a determining factor in the airport chosen by travelers.

Clearly, airport operators are concerned about airport access congestion. With the projected increase in enplanements over the next 10 years these concerns will probably increase. The pref-

Table 1: 1994 ACI-NA survey of airport surface access critical issues and concerns

Issue	No problem ←————→ Significant concern				
	1	2	3	4	5
Off-airport access roadway congestion	17%	25%	21%	15%	21%
On-airport roadway congestion	18%	28%	22%	19%	14%
Curbside congestion	5%	12%	22%	30%	31%

erence by passengers for automobile-based airport access and the increased demands for facilities to accommodate those automobiles will continue to put pressure on access facilities. Airport authorities and government agencies responsible for providing ground transportation access facilities will need to improve the way that automobiles are accommodated at airports, and increase the availability of competitive alternative high occupancy modes that decrease reliance on the private automobile.

It is anticipated that few conventional “new” airports will be constructed in the next decade, particularly in metropolitan areas of the United States. Consequently increases in air and landside activities brought on by such factors as ever increasing air traffic, new airlines, and larger aircraft will mean numerous existing airports will have to undergo expansion. Therefore the airport owner/operator and government agencies responsible for planning and providing transportation facilities will be directly involved in planning for improved access to existing airports and providing new access facilities to the few new airports that are built. These operators, planners and engineers will need guidance on how to better plan for airport access needs. The *Guide* will begin to provide that guidance.

Relationship Between Ground Transportation Characteristics and Originating Passengers

Planners and engineers usually determine airport facility needs based on existing and projected enplanements at an airport. Enplanements at an airport include all passenger trips that begin or end at that airport as well as any transfers from one flight to another. Unlike many other airport facilities, ground transportation access needs are driven primarily by passenger trips that begin or end at the airport.

At some airports such as Washington National and Oakland (CA), where almost 90 percent of all passengers start or end their trips locally, future ground transportation needs can be determined by using projected enplanements. At other airports, such as Atlanta Hartsfield and Chicago O’Hare, originations are less than 50 percent of total enplanements and ground access needs may not be well represented by passenger enplanements. A particular problem for determining ground access needs occurs when enplanements and originations grow at different rates such as was experienced at Baltimore Washington International Airport in the early 1990s.

One of the goals of the *Guide* is to provide planners with rules of thumb that can be used for preliminary assessments of ground access needs based on the experience of similar airports. In order to achieve this goal the *Guide* relates ground transportation characteristics with originating passengers at airports. This paper presents airport access facilities, parking requirements, curbside design, and mode of access characteristics of different size U.S. airports. These characteristics are summarized by the following annual originating passenger levels:

- Less than 500,000,
- 500,000 to 1 million,
- 1 million to 2.5 million, and
- Over 5 million.

Access Facilities

Airport access can be greatly improved by the construction of new roadways, including “dedi-

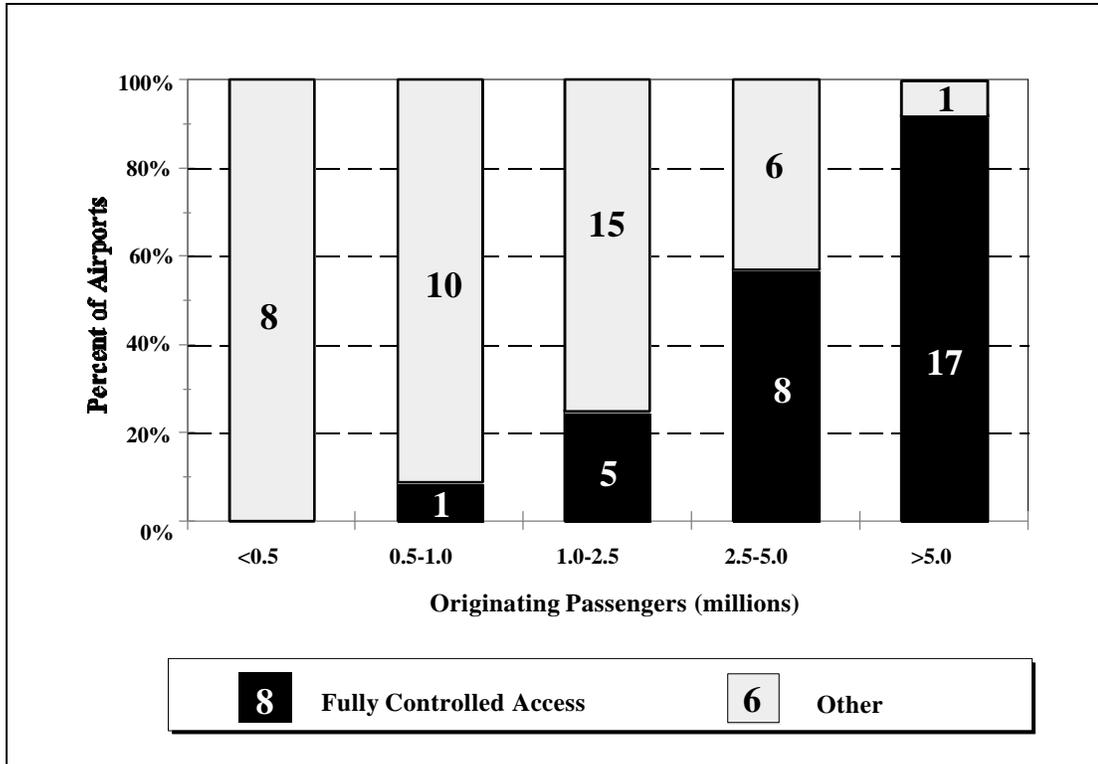


Figure 2: Primary airport roadway access facilities

cated” roadways that lead directly to the airport and spurs from freeways that are constructed in accordance with interstate design standards. Access highways to large airports often have full control of access with no crossings at grade, however most smaller airports with less than 2.5 million originating passengers function without being served by a controlled access facility. Figure 2 illustrates the proportion of different size airports that are directly served by controlled access facilities. As can be seen in this figure, 95 percent of the airports serving more than 2.5 million annual originating passengers are accessed via fully controlled highways. Only 20 percent of the airports with 1 to 2.5 million annual originations are served by fully controlled facilities and only one of the nineteen airports with less than a million originations have controlled access. This analysis shows that airports generally do not need to be served by controlled access facilities until they are seeing more than a million originating passengers, even then it is not critical until they are much larger.

A second analysis was performed to identify when airports begin to need more than one major roadway for access. The results of this analysis, which is displayed in Figure 3, indicates that multiple facilities are not usually needed until an airport is serving more than five million annual originations.

Curbside Configurations

One of the most valuable, highly utilized and congested components of an airport access system is terminal curbside. This area provide the most convenient location for passengers to transfer between an airport terminal building and ground access. It is used by automobiles, buses, taxis,

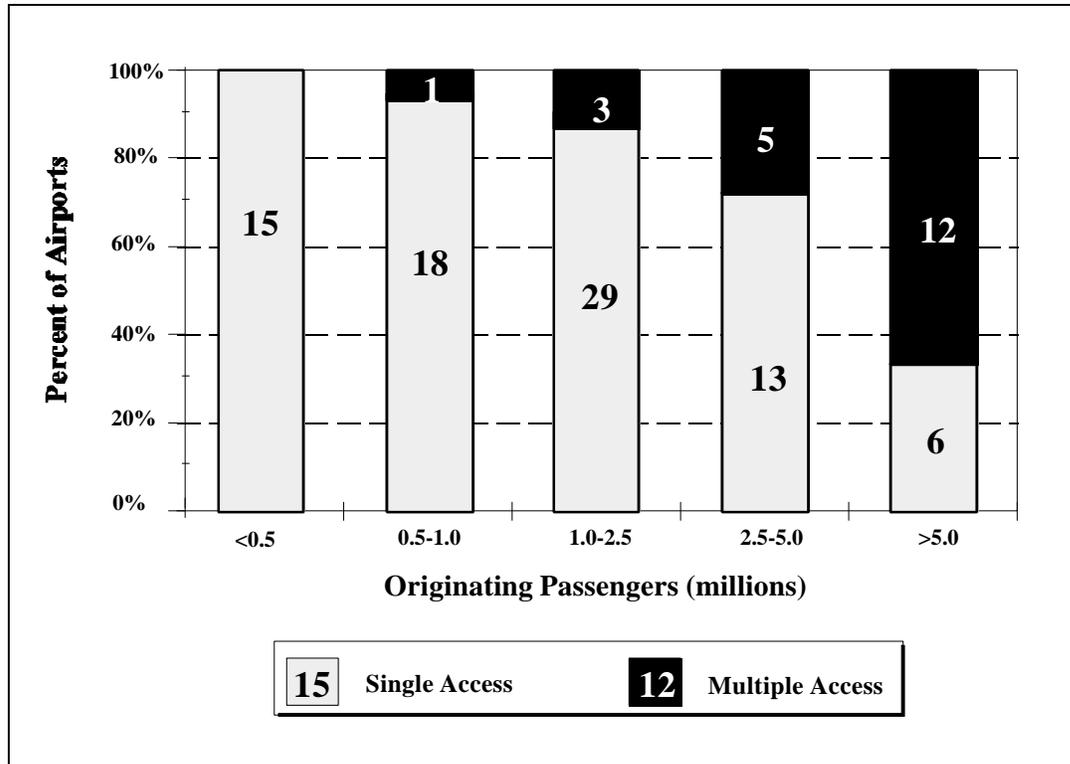


Figure 3: Airports with multiple access facilities

limousines, courtesy vehicles and other rubber-tired modes to pick up and discharge passengers that originate or terminate their air trip at the airport.

Additional curbside space can be provided in several ways, some of which are only appropriate when implemented with the construction of a new terminal facility or parking garage or reconstruction of existing facilities. Additional curbside space can be provided through:

- *Horizontal Curbside Separation* such as parallel curbsides with a raised center island for passenger pick up or drop off.
- *Vertical Curbside Separation* such as two roadways that serve different airport levels, and
- *Supplemental Curbside Areas* such as facilities adjacent to the terminal buildings in surface parking lots, parking structures, or “ground transportation centers”.

An analysis of the terminal design of over a hundred American airports of different sizes was performed to determine a relationship between curbside configuration and passenger originations. The results of this analysis are shown in Figure 4. This analysis found that most American airports with less than a million originations per year have single level terminals and as originations increase, the proportion of airports with multiple level terminals and roadways increase. Over 95 percent of the airports with less than a million originating passengers a year were providing curbside space using a single level terminal building. Almost 40 percent of the airports with 1 to 2 ½ million originations have single level terminals. Only 25 percent of the airports with 2 ½ to 5 million originations and less than 5 percent of the airports with over 5 million originations have single

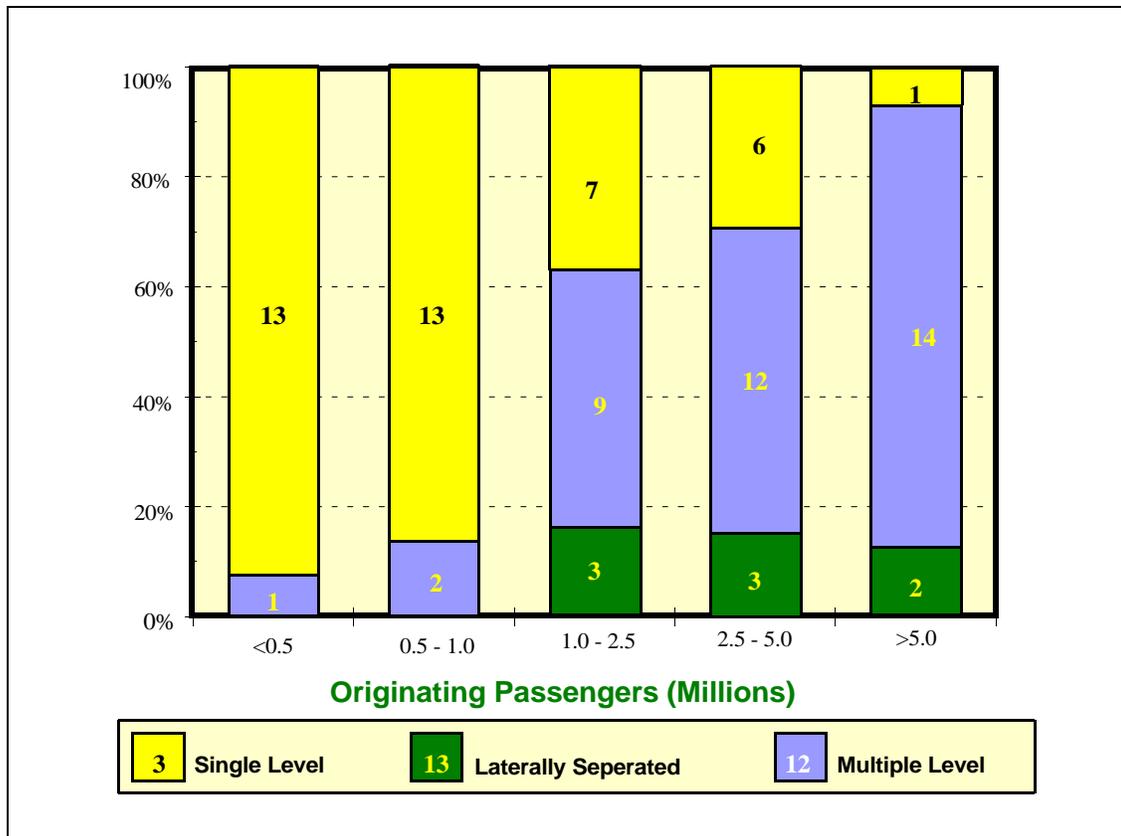


Figure 4: Airport terminal designs

level terminals. It was also noted from this analysis that 40% of the airports with less than 500,000 originations per year provide multiple curbsides through horizontal separation and supplemental curbside areas. This increases to over 60% of the airports with more than 5 million originations. Some airports, such as Boston Logan airport, have multiple curbside and terminal configurations that are provided at different terminals.

Parking Requirements

Since private automobiles are the primary mode used to access airports, parking needs can be expected to be directly related to the number of originating passengers. Parking supply data for over 85 airports was analyzed to determine if such a relationship exists.⁷ Figure 5 clearly demonstrates that airport parking supply increases with originations and indicates that a direct relationship may exist.

Mode of Access to U.S. Airports

Data on mode of access to airports was assembled from the most recent passenger surveys at 35 U.S. airports. Figure 6 provides the minimum, maximum, and median percent of passengers who access different size airports via high occupancy modes (i.e., rail, bus, van, limousine). Even though a clear cut relationship cannot be identified from the available data, several observations about mode of access to airports can be made from Figure 6. The proportion of passengers who use high occupancy ground access modes to reach an airport generally increases as originations

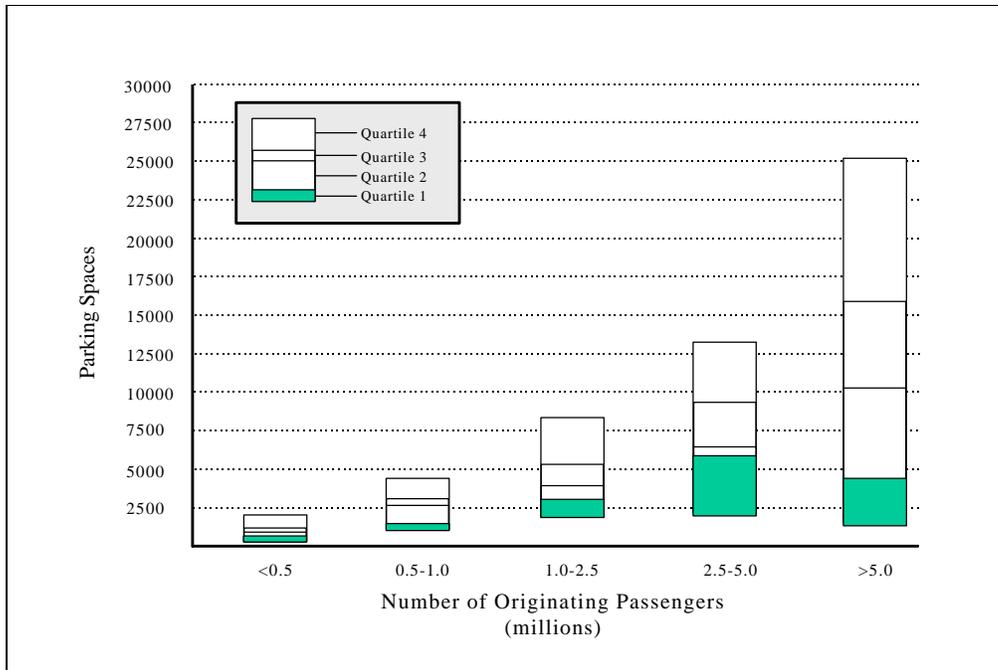


Figure 5: Parking requirements

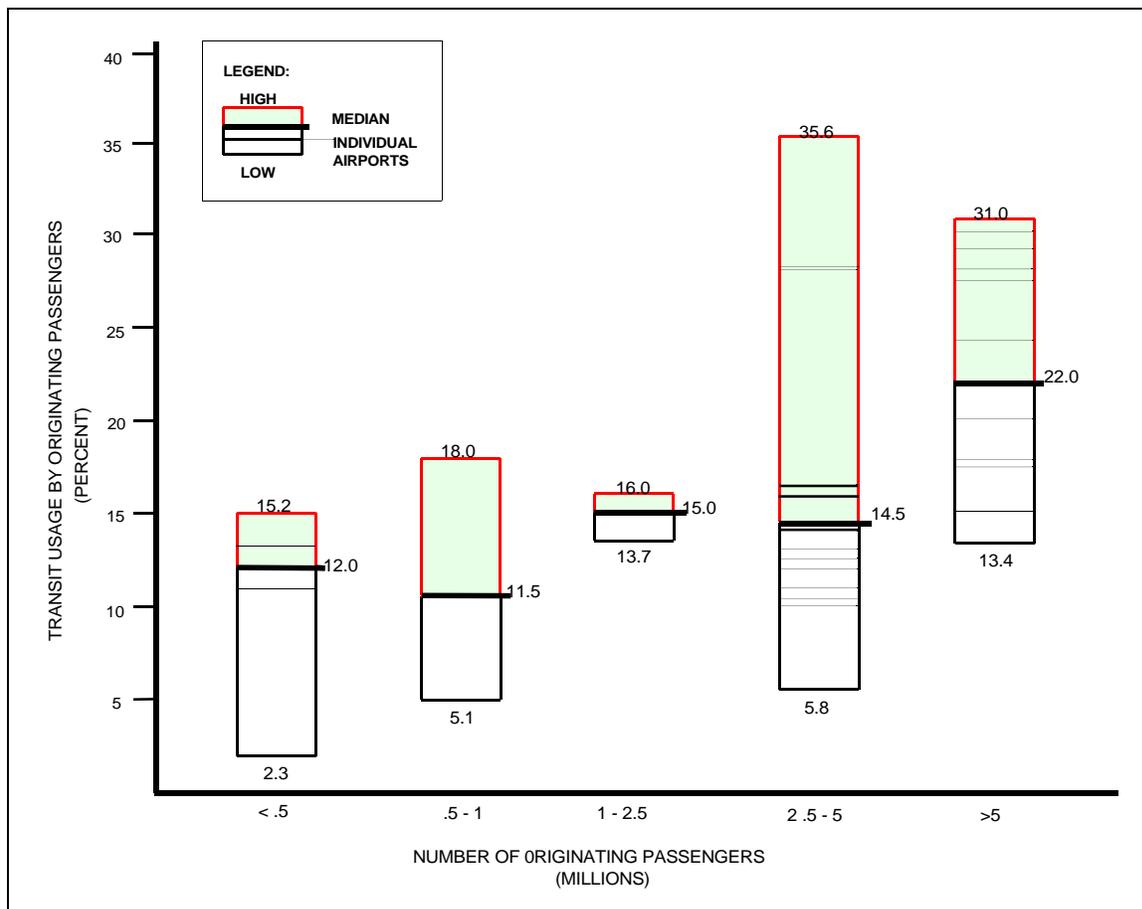


Figure 6: HOV use at U.S. airports

increase: the median value for access by a high occupancy mode at airports with less than five million annual originations is in the range of 11 to 15 percent, and the median for airports with over five million annual originations is 21 percent. The maximum transit use for airports with less than 2.5 million originations is 18 percent, and for airports with over 2.5 million originations is 35.6 percent.

Conclusion

Improved airport access facilities are becoming increasingly important to the efficient operation of an airport. The soon to be published *Intermodal Ground Access to Airports: A Planning Guide* provides rules of thumb, techniques, and data that can be used by planners, engineers and airport operators for groundside access planning. This *Guide* represents the existing state of the practice, and sets the stage for continuing development of airport groundside access data and analysis techniques.

FHWA and FAA are distributing the *Guide* to MPO's, Airports and others to help them perform access planning studies. FHWA and FAA will solicit feedback on this version of the *Guide* to determine its strength and weaknesses. While this *Guide* is a good start the need for some additional work related to this subject is already evident. Some suggestions for additional work include:

- Gather more data on airport access travel characteristics such as the number of ground access trips related to originations, employees, and cargo activity at different airports,
- The number of passengers traveling in each vehicle that enters an airport (vehicle occupancy).
- More information on peaking characteristics at different types of airports,
- Comparable guidance to the *Guide* for planning freight access to airports, and
- Development of better airport access related planning tools and models.

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